**Essential Question #3 - AS**

*JD’s AI/ML Laboratory*

**Due: 07/11/2025, 11:59 PM EST**

**General Instruction**: Please **answer all questions** and provide relevant support from literature using **APA references**. You can answer the questions using bullet points with citations (preferably from peer-review journals). Keep in mind that most science competitions focus on participants having a very strong grasp of the literature. I would highly recommend printing out the relevant journal articles and do a deep dive. Using a highlighter and writing notes on the journal article can help you narrow down important content for future reference. I will be thorough in my review of your response and expect all the answers to be well thought-out and clearly explained with supporting literature.

1. Explore various interpretability methods, how would you compare different models
2. What is the difference between interpretability and explainability
3. Incorporate Cross Validation during training
4. How would you adjust the decision threshold value to increase the Recall value
5. Explore how to balance model performance with model interpretability
6. Look for literature on model performance and interpretability
7. Explore the use of 1D CNN + LSTM model, focusing on the methodology
8. Train a machine learning model that would help you answer your scientific question
9. Draft PowerPoint with Background, Research Question, Hypothesis, research plan, EDA, Analysis Flowchart, ML model analysis, results, conclusions.
10. Prepare for oral presentation on Friday
11. Draft research paper outline